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SURVIVAL INCREASED BY CAREFULNESS IN FIELD PLANTING

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It has long been believed that survival in plantations in the northern Rocky Mountain region could be appreciably increased if regular field planting crews could be made to plant more carefully. Excavation of dead trees after planting has frequently revealed that many of the trees died because they had been planted in shallow holes with their roots doubled up, or because they had been improperly tamped, or because in some other way they had been carelessly set in the ground.

To ascertain the amount of loss due to these causes and to learn whether it could be overcome, trees were carefully planted in the spring of 1936 by members of a field study crew in rows beside check rows of the regular planting crew. The latter rows were simply lines of staked trees running crosswise of the regular crew planting rows. The trees in the carefully planted rows were marked with distinctive stakes. Both regular rows and carefully planted rows were examined in July and October. The first season results are available from 10 series of comparative rows containing 2,600 planted trees, located on the Kaniksu, Coeur d'Alene, and St. Joe National Forests.

Table 1 shows these results in terms of the trees that survived in both types of planting. The careful planting in all cases was done one to two days after the regular planting and under practically the same weather conditions.

All planting was done with 2-0 and 1-2 ponderosa pine planting stock, and the careful planters used stock from the same shipment as that for regular crew planting.

Table 1.--Percent of trees which survived in carefully planted rows as compared with regular crew planted rows

Forest	Locality	Test No.	Survival in July		Survival in October	
			Regular planting	Careful planting	Regular planting	Careful planting
			percent	percent	percent	percent
Kaniksu	Kalispell Bay	1	83	85	80	85
		2	79	95	71	92
		3	89	92	89	86
Coeur d'Alene	Magee R.S.	4	87	89	58	57
	Trail Cr.	5	78	93	55	70
	" "	6	87	91	62	84
	" "	7	79	87	64	72
St. Joe	Collins	8	86	89	80	81
		9	86	93	70	89
		10	81	84	56	70
Weighted average all 10 tests			77	83	66	77

As shown by the table, the average increase in survival at the end of the first season was 11 percent in favor of careful planting. In all the tests in which greater success was obtained, it can logically be attributed to a greater degree of care in planting, but in several cases additional reasons involving special precautions on the part of the careful planters may be indicated.

In the case of test 9, the planting was done on a white fir hazard disposal area on which green trees and snags had been felled and the debris burned broadcast in the spring only a week or two preceding planting. The ground was still matted with live roots and in unburned spots was covered with litter and duff. Under these difficult conditions, many of the trees set by the regular planters frequently were improperly tamped, and thus unable to establish absorption of soil moisture soon enough to prevent death by drying out. A special effort was made in the careful planting to select spots without roots, or to remove the roots, and tamp with soil free of debris. This doubtless accounted for most of the increase of 19 percent in survival.

In the case of test 2, the planting was done when the weather was unusually clear, windy, and of low atmospheric humidity. Under such conditions the instructions to keep the roots wet and exposed to the air as little as possible were doubly important. Here, as elsewhere, the average planter displayed an aversion to carrying excess water in the bottom of the planting bag. He displayed also the usual indifference toward exposure of roots in transferring plants from the heel-in bed to his bag and in handling from the bag to setting in the ground. The careful planters of the study crew, on the other hand, took precautions to observe the instructions to the letter, allowing as little exposure to drying air and wind as consistent with reasonable speed in planting. The resulting increase of 21 percent in survival indicates the very striking advantage in favor of carefulness in this respect and points to real possibilities of improvement in regular crew planting.

Although instructions emphasize the desirability of planting in the shade of natural objects such as stumps, logs, rocks, or movable pieces of debris, the regular crew planters did not take full advantage of the possibilities in this respect. In one row carefully planted by the study crew on a rather severe site, 29 trees planted in the shade gave a survival of 89 percent, whereas 71 trees planted in full sunlight gave a survival of only 58 percent.

In two cases out of ten, the results in table 1 show better survival by the regular crew than by the field study crew. The margin, however, is only 1 to 3 percent and may easily be accounted for by poorer spots available for planting. The study crew had to plant between the rows of the regular planters and obviously had less chance to select the most suitable spots.

The points emphasized in the careful planting were proper tamping without air pockets, roots placed straight down in holes of proper depth, planting free from sod competition and in shade wherever available. Care was also used in exposing roots to the air as little as possible.

The size of the loss--ranging as high as 22 percent and averaging 11 percent--which is found in this investigation as mainly due to careless planting is clearly of enough importance to call for special effort in correcting it. To do so will greatly help in attaining a more acceptable survival and consequent better stocking of plantations in this region.